overlap between the parts without the electrodes **2220** and the color filters of respective colors are substantially equal to one another.

[0092] FIG. **11C** is a view in a case where the cycle SPN is set so that an end of the electrode **2220** shifts in the y direction over a distance of four times the subpixel interval CFSY, the electrode **2220** is turned. In other words, FIG. **11C** is a view in a case where SPN=2×(4×CFSY)/TAN(θ). In this example, in the region R**22**, respective areas of overlap between the parts without the electrodes **2220** and the color filters of respective colors are substantially equal to one another.

[0093] FIG. **11D** is a view in a case where the cycle SPN is set so that an end of the electrode **2220** shifts in the y direction over a distance of five times the subpixel interval CFSY, the electrode **2220** is turned. In other words, FIG. **11D** is a view in a case where SPN=2×(5×CFSY)/TAN(θ). In this example, in the region R**23**, respective areas of overlap between the parts without the electrodes **2220** and the color filters of respective colors are substantially equal to one another.

[0094] In this way, when the cycle SPN is 2×(3×CFSY)/TAN(θ) or more, the color balance is not lost. Therefore, the touch-panel-equipped display device preferably satisfies the following expression (4):

$$SPN \geq (6 \times CFSY)/TAN(\theta) \qquad (4)$$

[0095] On the other hand, as the cycle SPN is smaller, the amplitude of the electrode in the y direction can be decreased. From the viewpoint of the degree of freedom for layout of the sensor pattern layer **2220**, therefore, the cycle SPN is preferably set as small as possible within such a range that the coloring balance is not lost. The touch-panel-equipped display device, therefore, more preferably satisfies the following expression (5):

$$SPN = (6 \times CFSY)/TAN(\theta) \qquad (5)$$

[0096] The foregoing description describes the touch-panel-equipped display device according to Embodiment 2 of the present invention. According to the present embodiment, the degree of freedom for the layout of the electrodes **2220** can be improved.

Other Embodiments

[0097] The foregoing description describes the embodiments of the present invention, but the present invention is not limited to the embodiments mentioned above. Many variations can be made within the scope of the invention. Further, any of the embodiments can be combined appropriately and implemented.

[0098] As illustrated in examples of the above-described embodiments, moire occurs in the direction in which color filters are aligned, when the sensor interval is close to an integer multiple of the size of the pixel. As the above-described embodiment, a case is described in which the sensor interval SY is set to CFSY×4 to CFSY×5, as a requirement for preventing the sensor interval from becoming an integer multiple of the pixel size. In other words, a case where the sensor interval SY is set to 4/3 times the pixel size to 5/3 times the pixel size is described.

[0099] On the other hand, since the sensor interval SY may not be an integer multiple of the pixel size, the sensor interval SY may be set to CFSY×7 to CFSY×8 (7/3 times the pixel size to 8/3 times the pixel size), or CFSY×10 to CFSY×11 (10/3 times the pixel size to 11/3 times the pixel size), . . . or the like. In other words, the sensor interval SY may be set to CFSY×(3×m+1) to CFSY×(3×(m+1)−1) where m is a positive integer.

[0100] The present embodiment described above is described with reference to a case where the color filter layer includes the red color filters, the green color filters, and the blue color filters. The combination of the color filters, however, is not limited to the above-described combination.

[0101] Further, the color filter layer may include color filters of four or more colors. For example, the color filter layer may further include white color filters, in addition to the red color filters, the green color filters, and the blue color filters.

[0102] When the color filter layer includes n color filters where n is an integer of 3 or more, moire can be reduced, if the following expression (1) is satisfied:

$$CFSY \times (n \times m+1) \leq SY \leq CFSY \times (n \times (m+1)-1) \qquad (1)$$

1. A touch-panel-equipped display device comprising:

a color filter layer including a plurality of pixels that are arranged in matrix along a first direction and a second direction that intersect at a right angle; and

a sensor pattern layer including a plurality of electrodes that are arranged along the second direction at a predetermined sensor interval SY, the sensor pattern layer being arranged so as to overlap the color filter layer when viewed in a direction vertical to the first direction and the second direction,

wherein each of the pixels includes n color filters that transmit light in wavelength ranges different from one another, respectively, where n is an integer of 3 or more,

the n color filters are arranged along the second direction at a predetermined subpixel interval CFSY, and

the sensor interval SY and the subpixel interval CFSY satisfy an expression (1) below:

$$CFSY \times (n \times m+1) \leq SY \leq CFSY \times (n \times (m+1)-1) \qquad (1)$$

where m is a positive integer.

2. The touch-panel-equipped display device according to claim **1** wherein the n representing the number of the color filters is 3, and an expression (2) below is satisfied:

$$CFSY \times 4 \leq SY \leq CFSY \times 5 \qquad (2)$$

3. The touch-panel-equipped display device according to claim **2**,

wherein the pixels are arranged along the first direction at a predetermined pixel interval CFX,

each of the electrodes are formed so that a bias angle θ is formed between each electrode and the first direction, and

the subpixel interval CFSY, the pixel interval CFX, and the bias angle satisfy an expression (3) below:

$$a \tan(2/3 \times CFSY/CFX) \leq \theta \leq a \tan(2 \times CFSY/CFX) \qquad (3)$$

4. The touch-panel-equipped display device according to claim **3**,

wherein each of the electrodes is turned every ½ of a predetermined cycle SPN along the first direction in such a manner that an angle formed between the electrode and the first direction is reversed, and

the subpixel interval CFSY, the bias angle θ, and the cycle SPN satisfy an expression (4) below:

$$SPN \leq (6 \times CFSY)/TAN(\theta) \qquad (4)$$